

SOUND FLASHLIGHT FOR THE
BLIND

Victor Twersky

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AMERICAN PRINTING
HOUSE FOR THE BLIND**

1 BILLION to ONE!

SPECIFICATIONS

BALLANTINE MODEL 300 ELECTRONIC VOLTMETER

RANGE: .001 to 100 Volts, r.m.s. (.00001 to 10,000 Volts, with accessories)

ACCURACY: $\pm 2\%$ at any point on the scale.

FREQUENCY: 10 cycles to 150,000 cycles.

STABILITY: Permanent calibration—unaffected by variation in line voltage, tubes, etc.

METER: Logarithmic Voltage scale and uniform decibel scale.

AC OPERATION: Will operate on 105-125 Volts, 50-60 cycles. (Battery operated models also available)



since 1935
the only VOLTMETER
featuring a simplified
**LOGARITHMIC
SCALE**

MODEL 300
ELECTRONIC
VOLTMETER



MODEL 220 DECADE AMPLIFIER



MODEL 402 MULTIPLIER

The Model 300 Voltmeter is a valuable tool for measurements in communication and "weak current" engineering. Its unusual sensitivity, accuracy and stability make it ideal for work in the audio, carrier, and supersonic ranges. Logarithmic meter indication assures uniform accuracy of reading over the whole scale while permitting range switching in decade steps. There is but one scale to read for all ranges. Output jack and output control are provided so that the voltmeter can be used as a high-gain stable amplifier.

Accessories include Model 220 Decade Amplifier, which supplies standardized gains of 10x and 100x, and the Model 402 Multiplier which supply additional ranges of 1,000 and 10,000 Volts.

Descriptive Bulletin No. 12 Available

BALLANTINE LABORATORIES, INC.
BOONTON, NEW JERSEY, U. S. A.

TUBES AT WORK

(continued)

adapter then proceeds to verify the agreement of the minute impulse units with itself and to correct any variations from accurate time which might have occurred in them during the preceding hour.

Sound Flashlight for the Blind

BY VICTOR TWERSKY

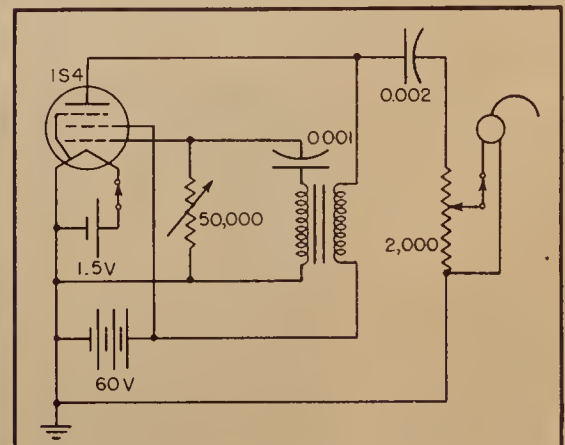
Technical Adviser, Guidance Device Project
Biology Department
City College of New York
New York

VARIOUS obstacle-detecting devices to aid the blind in foot travel are being studied by research laboratories. A group of students from the City College of New York have developed a relatively simple "sound flashlight" which has proved successful in aiding sightless persons to detect and avoid objects in walking which might otherwise be discovered by collision.

Similar in size and shape to a large flashlight, the unit is carried by the blind person with a scanning motion. Sound waves projected from the unit in a narrow beam are reflected by solid objects, and the reflected sound warns the user of the object's presence.

The heart of the unit is a single-tube oscillator powered by hearing-aid batteries. The circuit is shown in the accompanying schematic diagram. A headphone unit was chosen for the transducer, and its inductance in conjunction with the 0.002- μ f capacitor form a resonant circuit for the desired frequency range between 8 kc and 15 kc.

The choice of this range of frequencies was guided by the consideration of reflection and interference from ambient noises which might be encountered out of doors. It was found advisable to make the frequency adjustable to allow



Complete circuit of the obstacle-detecting oscillator

HOW

Resistance-Voltage Characteristics are altered by Resistor Design

Here are negative resistance-voltage curves plotted for two GLOBAR type BNR RESISTORS. Both resistors are voltage sensitive. However, the two curves coincide at one point only, namely, 30 volts. But, of more importance, observe how the difference in resistor design drastically alters its characteristics. Note the effect a change in the shape of the resistor has on the slope of its resistance-voltage curve. Fundamentally, this change in characteristics is accomplished by altering the specific resistance of the resistor.

Graphically presented here, this variance in characteristics—caused by resistor design points up an important factor in specifying and ordering GLOBAR resistors to meet exact needs of specific applications. It is a good reason why GLOBAR resistors are not carried in stock, but are quickly made to your requirements.

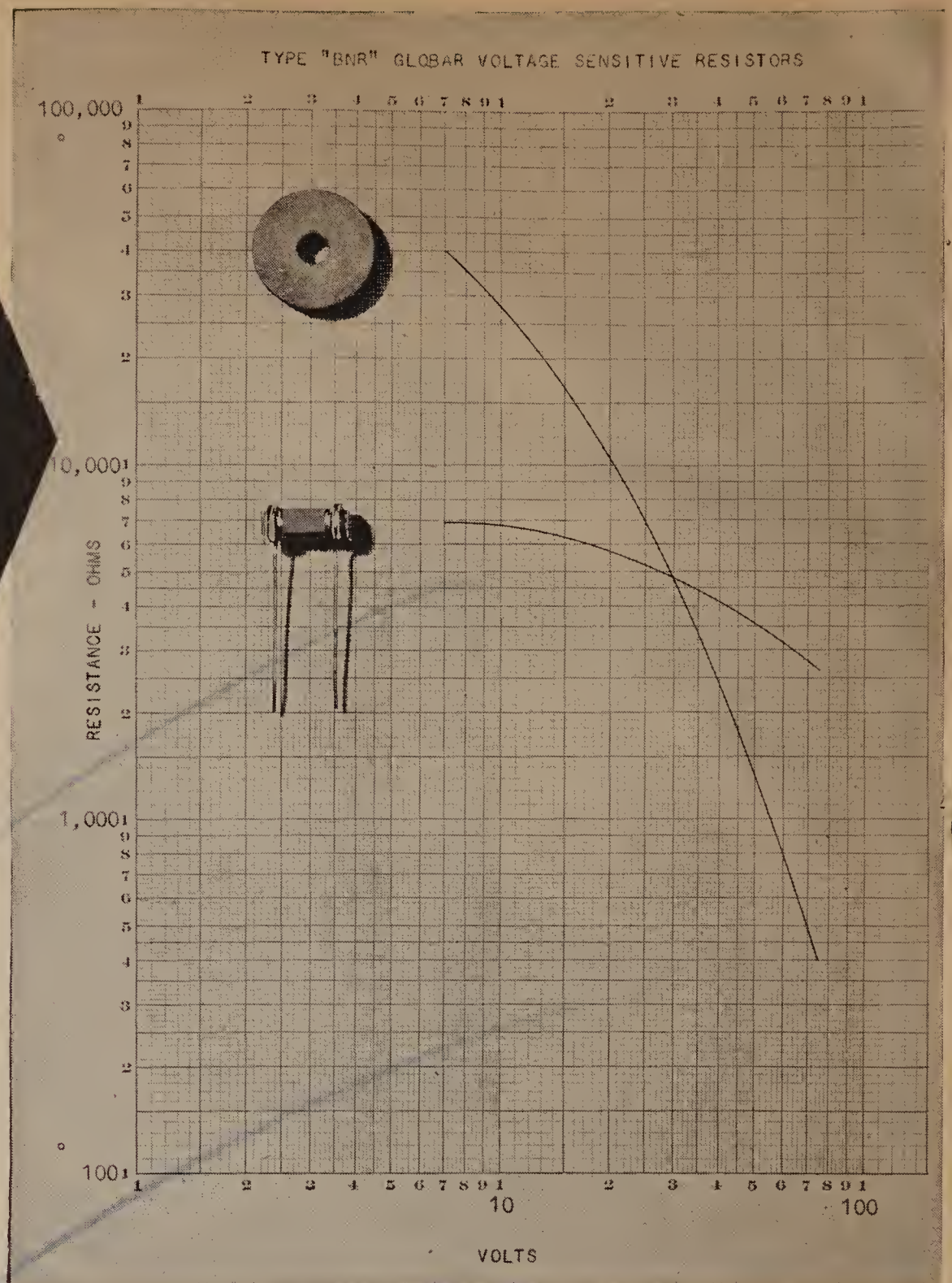
To save time and trouble in producing for you voltage sensitive resistors that

will do the job for which they are intended, we ask only that you furnish a few simple facts. Briefly tabulated, this necessary information is:

- 1 Type of apparatus in which the resistors are to be used.
- 2 Method of mounting and space limitations.
- 3 Normal operating voltage and peak voltage if available.
- 4 Resistance and inductance of the circuit if available.

- 5 Ohmic resistance of the resistor and allowable plus and minus tolerance.
- 6 Maximum voltage applied continuously or intermittently.
- 7 Duration of load and elapse of time between its application.

For your engineering tests, we can furnish samples in a hurry. For any information that may be helpful in working out your resistor problems, write Dept. V-108, The Carborundum Company, GLOBAR Division, Niagara Falls, N. Y.



GLOBAR Ceramic Resistors

BY CARBORUNDUM

TRADE MARK



"Carborundum" and "Globalar" are registered trademarks which indicate manufacture by The Carborundum Company

The Heart of a Fishing Reel

Fishing reel gears must operate smoothly at a speed of 3000 revolutions per minute or more, when a cast is executed. These gears must also withstand the strain of hauling in a fighting fish of unpredictable size and strength, thus rendering a dual purpose: speed and velvety smoothness in one direction—strength and durability in the other.

Instruments and machines have individual gear problems. For over a quarter of a century, Quaker City Gear Works has solved thousands of them and produced millions of gears of every description up to 60" in diameter for manufacturers in many diversified industries.

Aircraft controls, dental drills, electric clocks, gauges, indicators, heat controls, machine tools, radar, radios, washing machines and motion picture projectors are but a few of the many conveniences of modern progress which depend upon the heartbeat of Quaker City Gears. Your gear problem is our business, our large productive capacity is at your service.

YOUR INQUIRIES WILL RECEIVE PROMPT ATTENTION

The heart of the Outdoorsman Castomatic reel illustrated above is but one of many gear trains developed by our engineers and produced in our fully equipped plant.

Quaker City Gear Works

INCORPORATED

1910 N. Front Street, Philadelphia 22, Pa.



In appearance, the sound flashlight resembles the conventional type

changes for different conditions and for relief of ear fatigue. Experimenters noticed that sound at frequencies below 10 kc attracted considerable undesired attention from bystanders.

Beam widths between 12 and 30 degrees (depending on frequency) are possible with the reflector which is 4 inches in axial length and 4 inches in diameter at the mouth. The reflector is made of spun aluminum covered with papier maché.

The headphone transducer is mounted at the focal point of the reflector. It is insulated from the metallic reflector by a layer of sponge rubber and held in place by rubber cement and papier maché. A male plug is embedded in the rear of the horn for connection of the extension cord from the oscillator which is carried in a pocket.

To reduce the intensity of the sound reaching the user caused by leakage around the rim, baffles of cotton and sponge rubber are used with only slight reduction in the intensity of the main lobe.

Although the sound flashlight was designed primarily as an obstacle detector, skilled operators



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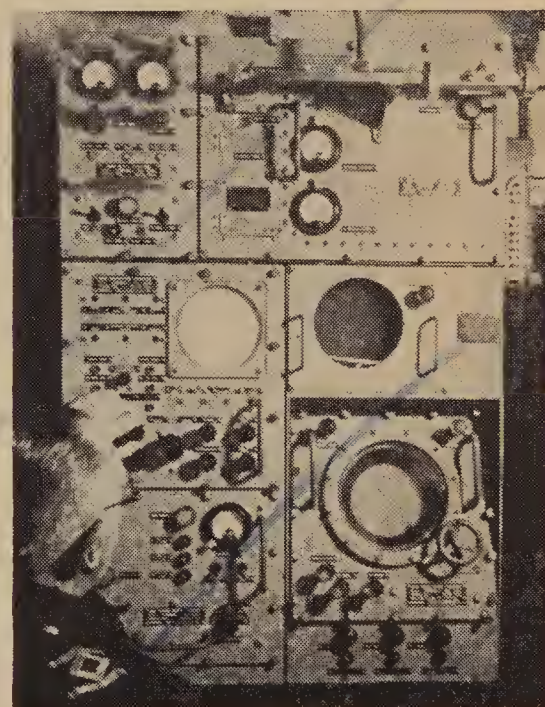
TUBES AT WORK

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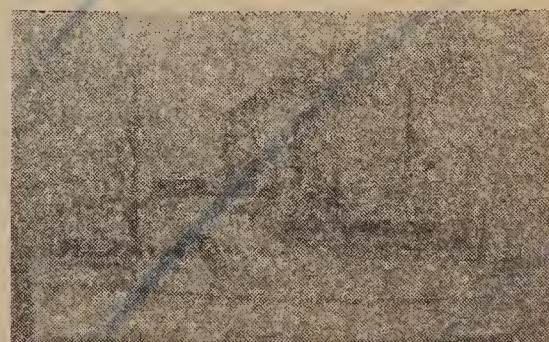
have been able to detect slight depressions by directing the beam so that it makes an angle of about 60 degrees with the ground. The device is most successful, however, in detecting such obstructions as trees, lamp posts, parked vehicles, hedges, flights of stairs leading up, and open doorways.

Preliminary tests showed that detection was possible at distances up to and greater than 30 feet, depending on the number of obstacles present, the prevailing acoustical conditions and the user's experience and proficiency.

RADAR-EQUIPPED LINER BERTHS IN FOG



Radar installation in iron hutch atop navigation bridge of 20,000-ton Canadian Pacific line's "Empress of Canada" with plan position indicator screen just above operator's head. Repeater tube is located on navigation bridge for use by captain and pilot, who keep in contact with the trained radar operator by telephone when interpretation of complex patterns is required



View of "Empress of Canada" running into fog in the Mersey. This ship recently came into Liverpool harbor in total fog and reached her berth entirely by radar. The landing stage could be seen by the crew only after they had gone half-way down the gangplank. The ship is fitted with British Admiralty type 268 radar

SPECIFY THIS TUBE

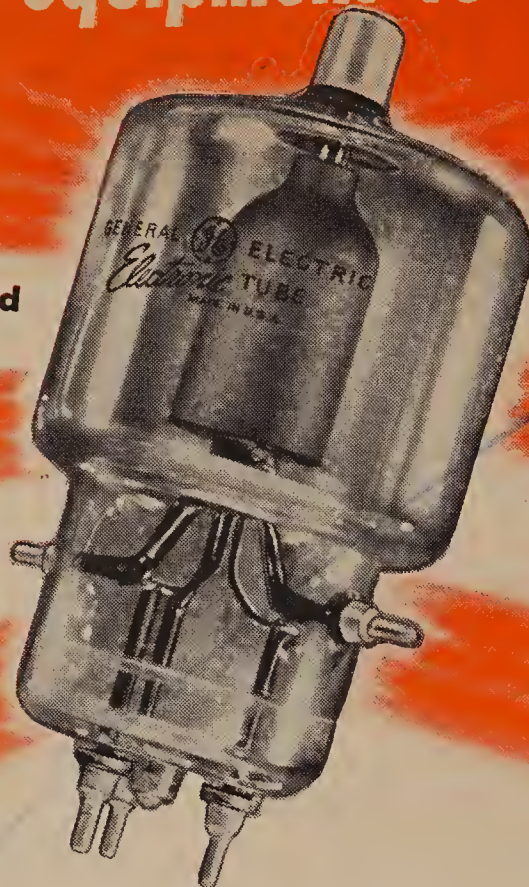
for h-f heating equipment to do these jobs—

Seal, stitch, and join plastics and various other substances

Surface-harden or anneal small metal parts

Braze—quick-solder—set glues by heat conduction

Defrost and cook foods electronically



"IF YOU MANUFACTURE SMALL ELECTRONIC HEATERS, YOU'LL FIND TYPE GL-592 THE RIGHT OSCILLATOR OF LATEST DESIGN—POWERFUL, COMPACT, ECONOMICAL, LONG-LIVED!"

NATURALLY you want to profit from the zooming demand for electronic heaters for high-speed repetitive work. And knowing it's the oscillator tube that makes or mars performance, you intend to be extra-careful about tube high frequency—ample capacity in watts—reliability that users can bank on—availability you can bank on!

These qualities are packaged in Type GL-592. The tube already is in service, helping to speed plant output. Stocks are on hand to meet your requirements, and sockets, grid connectors, finned anode connectors, all are available. *Specify and install...* there'll be no lag between the two!

That high frequency ceiling (150 mc at full ratings) means Type GL-592 will handle easily the up-to-70-mc requirements of bench dielectric heaters, not to

mention lower-frequency induction work. The tube carries substantial plate ratings, and if still more power is desired, a pair or two pairs may be employed without prohibitive increase in cost or size of the equipment. Conversion efficiencies above 70 percent are routine for the GL-592 in properly designed circuits. Cooling calls for merely an 8-inch household-type fan, or a small and inexpensive pressure blower.

The tube is sturdy—cathode, grid, and anode are solidly mounted and braced. All leads are short. Fernico metal-to-glass seals mean (1) no cemented caps or bases with the dielectric losses these entail, (2) no soft-soldered leads or terminals to come loose.

Get further facts about this modern, efficient, *tough* triode—including the favorable price—from your nearby G-E electronics office! Or wire or write *Electronics Department, General Electric Company, Schenectady 5, New York.*



GL-592 Power Triode

Ratings, Class C Power Amplifier and Oscillator

Filament voltage		10 v
current		5 amp
Max ratings:	CCS	ICAS
d-c plate voltage	3,500 v	3,500 v
d-c grid voltage	—500 v	—500 v
d-c plate current	250 ma	350 ma
d-c grid current	50 ma	100 ma
plate input	670 w	1,000 w
plate dissipation	200 w	300 w
Type of cooling		forced-air
Frequency at max ratings		150 mc

The G-E line of power triodes for electronic heating is complete, covering every need and application. Tube types range in max plate voltage from 2,000 v to 20,000 v—max current, from 25 ma to 10 amp—max dissipation from 125 w to 100 kw. Prices and details on any or all types will be supplied at your request.

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